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EXAMINER
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ART UNIT	PAPER NUMBER
2623	

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Please find below and/or attached an Office communication concerning this application or proceeding.

PTO-90C (Rev. 07-01)

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE _3_ MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.
- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1) ☐ Responsive to communication(s) filed on _____ .

2a) ☐ This action is **FINAL**.　　2b) ☒ This action is non-final.

3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4) ☒ Claim(s) _1-42_ is/are pending in the application.

　　4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5) ☐ Claim(s) _____ is/are allowed.

6) ☒ Claim(s) _1-42_ is/are rejected.

7) ☒ Claim(s) _1_ is/are objected to.

8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9) ☒ The specification is objected to by the Examiner.

10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.

　　Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

11) ☐ The proposed drawing correction filed on _____ is: a) ☐ approved b) ☐ disapproved by the Examiner.

　　If approved, corrected drawings are required in reply to this Office action.

12) ☐ The oath or declaration is objected to by the Examiner.

Priority under 35 U.S.C. §§ 119 and 120

13) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

　　a) ☐ All b) ☐ Some * c) ☐ None of:

　　　1. ☐ Certified copies of the priority documents have been received.

　　　2. ☐ Certified copies of the priority documents have been received in Application No. _____ .

　　　3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

　　* See the attached detailed Office action for a list of the certified copies not received.

14) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).

　　a) ☐ The translation of the foreign language provisional application has been received.

15) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)

2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)

3) ☒ Information Disclosure Statement(s) (PTO-1449) Paper No(s) _____ .

4) ☐ Interview Summary (PTO-413) Paper No(s). _____ .

5) ☐ Notice of Informal Patent Application (PTO-152)

6) ☐ Other: _____ .

DETAILED ACTION

Information Disclosure Statement

1.   The information disclosure statement filed 12/6/99 fails to comply with 37 CFR

1.98(a)(3) because it does not include a concise explanation of the relevance, as it is presently

understood by the individual designated in 37 CFR 1.56(c) most knowledgeable about the

content of the information, of each patent listed that is not in the English language. It has been

placed in the application file, but the information referred to therein has not been considered.

Specification

2.   The abstract of the disclosure is objected to because the word "the" should be included

before the word "pixels" in line 2. Correction is required. See MPEP § 608.01(b).

3.   The disclosure is objected to because of the following informalities: the word "(For" on

page 5, line 19 should be changed to "For" and the word "Sober" on page 30, line 19 should be

changed to "Sobel."

         Appropriate correction is required.

Claim Objections

4.   Claim 1 is objected to because of the following informality: the word "a" should be

added to the end of line 3. Appropriate correction is required.

Claim Rejections - 35 USC § 102

5.   The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the

basis for the rejections under this section made in this Office action:

> A person shall be entitled to a patent unless –
>
> (e) the invention was described in a patent granted on an application for patent by another filed in the United
> States before the invention thereof by the applicant for patent, or on an international application by another who
> has fulfilled the requirements of paragraphs (1), (2), and (4) of section 371(c) of this title before the invention
> thereof by the applicant for patent.

The changes made to 35 U.S.C. 102(e) by the American Inventors Protection Act of 1999

(AIPA) do not apply to the examination of this application as the application being examined

was not (1) filed on or after November 29, 2000, or (2) voluntarily published under 35 U.S.C.

122(b). Therefore, this application is examined under 35 U.S.C. 102(e) prior to the amendment

by the AIPA (pre-AIPA 35 U.S.C. 102(e)).

6.   Claims 1, 2, 5, 10, 19, and 31 are rejected under 35 U.S.C. 102(e) as being anticipated by

Lin et al. (6,292,582).

Regarding claim 1, Lin et al. ("Lin") discloses an image processing apparatus with a

gradient calculation means for calculating the direction of the level gradient of a processing unit

(Col. 10, lines 8-11). Lin also discloses a line segment formation means (Col. 12, lines 41-42)

having a direction corresponding to the direction of the level gradient as shown in Figures 7 and

8 (Col. 12, lines 42-45). Lin also includes line segment image storage means for storing the line

segment image data (Col. 11, lines 1-3).

Regarding claim 2, Lin discloses an image storage means for storing the image data (Col.

5, lines 63-64).

Regarding claim 5, Lin discloses a line segment formation means producing line segment

image data at a gray level (Col. 13, line 15).

Regarding claim 10, Lin discloses a line segment image storage means that appends or "adds" new line segment image data to line segment image data already stored at each of the pixels (Col. 15, lines 59-62).

Regarding claim 19, Lin discloses an image input means having a camera for producing image data and feeding the produced image data to said gradient calculation means (Col. 6, line 36).

Regarding claim 31, Lin discloses an image processing method (Abstract, line 1). The arguments analogous to those presented above for claim 1 are applicable to claim 31.

Claim Rejections - 35 USC § 103

7.   The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

8.   Claims 20-22, 28-30, and 32-34 are rejected under 35 U.S.C. 103(a) as being unpatentable over Lin et al. (6,292,582).

Regarding claim 20, Lin discloses displaying the results 704 (Figure 41c). Lin also discloses a line segment image as shown in Figure 7. Lin does not expressly recognize the need to display the line segment image. However, it would have been obvious to one of ordinary skill in the art at the time of the invention to have used the display means and line segment image as

disclosed by Lin to display a line segment image represented by the line segment image data in order to illustrate the results of the line segment formation.

Regarding claim 21, Lin discloses displaying the results 704 (Figure 41c). Lin also discloses an image represented by the given image data aligned or "overlapped" with the line segment image as shown in Figure 30a (Col. 26. lines 39-41). Lin does not expressly recognize the need to display the image. However, it would have been obvious to one of ordinary skill in the art at the time of the invention to have used the display means and the image represented by the given image data overlapped with the line segment image to display an image represented by the given image data overlapped with the line segment image in order to compare the results of line segment formation with the given image data.

Regarding claim 22, Lin discloses displaying the results 704 (Figure 41c). Lin discloses a means for extracting an edge of the image represented by the given image data as shown in Figure 20a. Lin also discloses a line segment image (Figure 7). Lin does not expressly recognize the need to display the image represented by the extracted edge overlapped with the line segment image. However, Lin teaches that it is known to superimpose one image over that of a second image (Col. 14, lines 30-31). Therefore, it would have been obvious to one of ordinary skill in the art at the time of the invention to have used the display means, the extracted edge image, and the line segment image as disclosed by Lin to display an image represented by the extracted edge overlapped with the line segment image in order to compare the results.

Regarding claim 28, the arguments analogous to those presented above for claims 1 and 20 are applicable to claim 28.

Regarding claim 29, the arguments analogous to those presented above for claim 21 are applicable to claim 29.

Regarding claim 30, the arguments analogous to those presented above for claim 22 are applicable to claim 30.

Claim 32 is drawn to a medium storing program for controlling a computer to calculate the direction of the gradient, produce line segment image data, and store the line segment, which corresponds to claim 1. The arguments analogous to those presented above for claim 1 are applicable to claim 32. While Lin does not appear to explicitly mention a medium storing program, this would have been clearly obvious in light of Lin's disclosure. Note, the computers shown in Figure 27 establish his system as being or relating to a computer based system.

Regarding claim 33, Lin discloses an image processing method (Abstract, line 1). The arguments analogous to those presented above for claim 28 are applicable to claim 33.

Regarding claim 34, the arguments analogous to those presented above for claims 28 and 32 are applicable to claim 34.

9.   Claims 3, 4, 7-9, 16, and 35-40 are rejected under 35 U.S.C. 103(a) as being unpatentable over Lin et al. (6,292,582) in view of Alves et al. (5,093,869).

Regarding claim 3, Alves et al. ("Alves") discloses an image data extraction means. The low level feature detector 11 extracts the image data in a processing region set in input image data (Col. 3, lines 4-10). The low level feature detector also performs the gradient calculation means (Col. 3, lines 43-45), therefore, the extracted image data is fed to the gradient calculation means.

Regarding claim 4, Lin discloses a means for setting the processing region. The

decomposition window 98 or the "processing region" may have a default search pattern (Col. 10,

lines 10-11). The search pattern of the processing region may be set by programming (Col. 10,

lines 54-56).

Regarding claim 7, Alves discloses a gradient calculation means that calculates the

magnitude (Col. 3, line 44) of the level gradient as well as the direction (Col. 5, lines 41-53) for

the level gradient.

Regarding claim 8, arguments analogous to those presented above for claim 7 are

applicable to claim 8. Alves also discloses a line segment formation means that produces line

segment image date having a level corresponding to the intensity or "magnitude" of the level

gradient which is calculated by the gradient calculation means (Col. 4, lines 26-27).

Regarding claim 9, arguments analogous to those presented above for claim 7 are

applicable to claim 9. Alves does not recognize the need for producing line segment image data

only when the magnitude of the level gradient is not less than a predetermined threshold.

However, Lin teaches considering only segments greater or "not less than" a predetermined

gradient threshold (Col. 10, lines 35-39). Therefore, it would have been obvious to one of

ordinary skill in the art at the time of the invention to have modified the line segment formation

means disclosed by Alves to include a predetermined threshold, as taught by Lin, in order to

avoid false detections.

Regarding claim 16, Alves discloses a means for analyzing or "detecting" a portion

where line segments are concentrated (Col. 5, lines 46-49). Alves does not recognize storing the

line segment image data. However, Lin et al. ("Lin") teaches that it is known to include line

segment image storage means for storing the line segment image data (Col. 11, lines 1-3).

Therefore, it would have been obvious to one of ordinary skill in the art at the time of the

invention to have modified the means for detecting as disclosed by Alves to have included line

segment image storage means, as taught by Lin, in order to store the locations of the line

segments.

Regarding claim 35, Alves discloses an image processing apparatus with a means for

extracting a plurality of edges (Figure 5b). Alves also discloses a means for setting a line

segment extending in a direction corresponding to the direction of the extracted edge (Figure 5c).

Alves discloses a means for analyzing or "detecting" the presence of a point of intersection of a

plurality of line segments and the position thereof (Col. 5, lines 46-49). Alves does not

recognize extracting a plurality of edges whose level gradients are not less than a predetermined

value. However, Lin teaches that it is known to use a predetermined gradient threshold (Col. 10,

lines 35-38). Therefore, it would have been obvious to one of ordinary skill in the art at the time

of the invention to have modified the means for extracting a plurality of edges as disclosed by

Alves to include using a predetermined gradient threshold, as taught by Lin, in order to avoid

false detections.

Regarding claim 36, Alves discloses a line segment in the same direction as the direction

of the edge (Figure 5c).

Regarding claim 37, the arguments analogous to those presented above for claims 1 and

16 are applicable to claim 37. Alves discloses an image input means 9 for inputting image data

representing an inspection object (Figure 1).

Regarding claim 38, the arguments analogous to those presented above for claim 1 are applicable to claim 38. Note that the direction corresponding to the direction of the level gradient is the direction of the level gradient.

Regarding claim 39, the arguments analogous to those presented above for claim 20 are applicable to claim 39.

Regarding claim 40, the arguments analogous to those presented above for claim 21 are applicable to claim 40.

10.   Claims 11-15 are rejected under 35 U.S.C. 103(a) as being unpatentable over Lin et al. (6,292,582) in view of Tachibana (5,898,440).

Regarding claim 11, the arguments analogous to those presented above for claim 1 are applicable to claim 11. Lin does not recognize storing new line segment image data without subjecting the line segment image data to addition processing. However, Tachibana teaches that it is known to store new line segment data without subjecting the line segment image data to addition processing (Col. 5, lines 7-17). Therefore, it would have been obvious to one of ordinary skill in the art at the time of the invention to have modified the image storage means as disclosed by Lin to store new line segment image data without subjecting the line segment image data to addition processing, as taught by Tachibana, in order to store the data.

Regarding claims 12 and 13, Tachibana teaches that it is known to have a line segment formation means that produces a line with given parameters (Col. 5, line 7). It would have been obvious to one of ordinary skill in the art at the time of the invention to have specified the parameters received by the line segment formation means to include a predetermined length and

a distance from the processing unit to an initial point and a terminal point in order to form line segments of a specified length.

Regarding claims 14 and 15, the arguments analogous to those presented above for claims 12 and 13 are applicable to claims 14 and 15. Note that allowing for given parameters (Col. 5, line 7) is a means for setting.

11.   Claims 17, 18, 24, and 25 are rejected under 35 U.S.C. 103(a) as being unpatentable over Lin et al. (6,292,582) in view of King et al. (5,929,557).

Regarding claim 17, Lin discloses an image processing apparatus that has line segment image data stored in a line segment image storage means. Lin does not recognize the need for detecting the position of the pixel having the maximum of the levels of the line segment image data. However, King et al. ("King") teaches a means for detecting the position of the pixel having the maximum gradient (Col. 11, lines 2-7). Therefore, it would have been obvious to one of ordinary skill in the art at the time of the invention to have modified the image apparatus as disclosed by Lin to use the means for detecting the position of the pixel having the maximum gradient, as taught by King, in order to detect the position of the pixel having the maximum of the levels of the line segment image data stored in the line segment image storage means.

Regarding claim 18, King discloses a means for judging whether or not the maximum level exceeds a predetermined threshold (Figure 9, element 320).

Regarding claim 24, the arguments analogous to those presented above for claims 17 and 22 are applicable to claim 24. King indicates the pixel that has the maximum level with a mark as shown in Figure 6 by elements 76a-76d. Therefore, it would have been obvious to one of ordinary skill in the art at the time of the invention to have displayed the mark indicating the

pixel with the maximum level as disclosed by King superimposed or "overlapped" with the image, as taught by Lin, in order to clearly illustrate the mark.

Regarding claim 25, the arguments analogous to those presented above for claims 18 and 24 are applicable to claim 25.

12. Claims 23, 26, 27, and 41 are rejected under 35 U.S.C. 103(a) as being unpatentable over Lin et al. (6,292,582) in view of Alves et al. (5,093,869) in further view of King et al. (5,929,557).

Regarding claim 23, the arguments analogous to those presented above for claims 16 and 22 are applicable to claim 23. Alves does not recognize displaying a mark representing the portion where the line segments are concentrated overlapped with the image represented by the image data. Note that as stated above for claim 24, King teaches that it is known to place a mark to indicate a position. Therefore, it would have been obvious to one of ordinary skill in the art at the time of the invention to have used the means for detecting a portion where line segments are concentrated as disclosed by Alves and placed a mark, as taught by King, in order to indicate the position and to display the mark superimposed or "overlapped" with the image, as taught by Lin, in order to clearly visualize the portion.

Regarding claim 26, Lin discloses displaying the results 704 (Figure 41c). Lin discloses a means for extracting an edge of the image represented by the given image data as shown in Figure 20a. Lin does not expressly recognize the need to display the image represented by the extracted edge overlapped with the image data. However, Lin teaches that it is known to superimpose one image over that of a second image (Col. 14, lines 30-31). Therefore, it would have been obvious to one of ordinary skill in the art at the time of the invention to have used the

display means, the extracted edge image, and the image data as disclosed by Lin to display an image represented by the edge extracted in addition to or in place of the image represented by the image data in order to view the results of the edge extraction.

Regarding claim 27, the arguments analogous to those presented above for claim 22 are applicable to claim 27.

Regarding claim 41, the arguments analogous to those presented above for claim 23 are applicable to claim 41.

13.   Claim 42 is rejected under 35 U.S.C. 103(a) as being unpatentable over Lin et al. (6,292,582) in view of Alves et al. (5,093,869) in further view of Tachiana (5,898,440).

Regarding claim 42, the arguments analogous to those presented above for claims 14 and 15 are applicable to claim 42.

14.   Claim 6 is rejected under 35 U.S.C. 103(a) as being unpatentable over Lin et al. (6,292,582) in view of Williams et al. (6,427,030).

Regarding claim 6, the arguments analogous to those presented above for claim 1 are applicable to claim 6. Lin does not recognize producing line segment image data at a binary level. However, Williams et al. ("Williams") teaches that it is known to convert gray level pixel image data to binary level pixel image data (Col. 1, lines 30-34). Therefore, it would have been obvious to one of ordinary skill to have modified the line segment formation means as disclosed by Lin to produce line segment image data at a binary level, as taught by Williams, in order to reduce the multi-level gray image data to a limited number of levels so that it is printable (Col. 1, lines 26-28).

Conclusion

15.　　The prior art made of record and not relied upon is considered pertinent to applicant's disclosure.

U.S. Pat. No. 6,408,109 to Silver et al. is cited for apparatus and method for detecting and sub-pixel location of edges in a digital image;

U.S. Pat. No. 4,974,261 to Nakahara et al. is cited for optical surface inspection method;

U.S. Pat. No. 5,903,660 to Huang et al. is cited for automatic background recognition and removal in projection digital radiographic images;

U.S. Pat. No. 5,887,082 to Mitsunaga et al. is cited for image detecting apparatus; and

U.S. Pat. No. 5,142,592 to Moler is cited for method and apparatus for detection of parallel edges in image processing.

Contact Information

16.　　Any inquiry concerning this communication or earlier communications from the examiner should be directed to Virginia M Kibler whose telephone number is (703) 306-4072. The examiner can normally be reached on M-F 8:30 - 5:00.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Amelia Au can be reached on (703) 308-6604. The fax phone numbers for the organization where this application or proceeding is assigned are (703) 872-9314 for regular communications and (703) 872-9314 for After Final communications.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is (703) 306-0377.

VK
September 5, 2002

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